CURRICULUM INTEGRATION OF VOCATIONAL TRAINING AND APPRENTICESHIP BASED TRAINING TO FULFILL COMPETENT WORKFORCE MARKET

Cahyani Windarto[1], Sukiyo[2]

[1,2]BalaiBesarLatihanKerjaIndustri Surakarta, DitjenBinaLattasKemnakertrans RI
[1]cahyaniwindarto@gmail.com, [2]sukiyo_sukron@yahoo.com

Abstract

Vocational training curriculum must be adaptive to industry in order to make competent workforce. Competency based training with apprenticeship program was an approach to vocational training center to ensure workforce could did activity in the workplace as a result of completing a program of training and matched with industry competency standards. This integrated system provides many advantages for government, industry and workforce. Involvement of stakeholders and apprentice partnerships started with vocational curriculum to pursue workforce competency and clear career pathways. Vocational curriculum were co-developed by vocational training center and expert from various industry which has aim to provide appropriate knowledge from vocational training center to the workplace in form apprentices in the respective industries. In simple word, apprentice partnerships with industry has encouraged part-time working and promoted flexible pathways of workforce recruitment.

A case study approach has been adopted to examine curriculum impact in fulfilling competent workforce market. Primary data were derived from observations, and conduct focus group interviews with workforces. Secondary data were obtained from websites, policy documents, curriculum and syllabus documents and teaching materials. This study focused on understanding of vocational curriculum, level of skill and qualification and apprenticeship outcomes.

Our finding highlight the importance of curriculum integration between vocational training and industry play an important role in improving the competence of the workforce to meet the needs of the workforce market.

Keywords: vocational training, curriculum, apprentice, competent.

1. Introduction

Future employment challenges increase heavily and more complex. Availability of employment opportunities in accordance with the level of workforce education increased in line with the opening of the free market. So,it was be mandatory to improve quality in order to compete in the international market and domestic market **[1]**. Improving quality of labor is done by holding a job training that aims to improve and develop competence, productivity, discipline, attitude, and work ethic at a certain level of skill and expertise and qualifications in accordance with the level of office or employment.The Association of Southeast Asian Nations (ASEAN) concentrates its emphasis onregional cooperation on security, sociocultural and economic integration with ASEAN Economic Community (AEC) by 2015. Establishing the AEC creates additional values in regional scope such as a common market economically connected through the basis of consistent production, free trade investment, capital transfer, labor market based on common and samefor all ASEAN member countries. By 2015,ASEAN will have become a community. In place of ten heterogeneous labor markets there will be a large labor market in which nations recognize one another's qualifications**[2]**.

Vocational training programs should be developed base on labor market demands and needs of the industry. Thereby industry will get advantages directly when hire competent worker from vocational training programs.If the graduates have a high quality, the industry will get benefits directly, because at initial time of recruitment,industry no need to spend more cost to provide industrial training.

Therefore it is proper if the industry has a responsibility to care,concern and take charge together with vocational training institutions.

Three countries have implemented training program which integrated with industry. First, Australia has implemented major vocational education training reforms in the last decade, including**[3]** :

1. introduction of a competence-based approach to training
2. implementation of the Australian Qualification Framework
3. development of the training market with a view to the needs of students and industry
4. mechanisms to enhance learning pathways
5. reform of apprenticeship training (new apprenticeship scheme)
6. introduction of a national framework for quality assurance and nationwide recognition of training providers.

Second, another best practices could be found in dual vocational education training system in Austrian, which has many commendable features, with well-structured apprenticeship that integrate learning in schools and workplace training **[4]**. Third, the German dual system has made the country has a competitive advantage by reducing unemployment rate successfully. In German there were no residentover25 years who do not work more than 3 months**[5]**. To support the dual system, government has set up a vocational education (collaborated with the industry in social responsibility industryprogram) for residents who do not have the ability to continue to higher education.

From the description above defined problem statements as follows.

1. Vocational training curriculumswereneeded to match with labor market demands.
2. Different level of skill and qualification base on curriculum among vocational training providers.
3. Unstandard apprenticeship model between training provider and industry to ensure graduates competency.

2. Methodology

A case study approach has been adopted to examine curriculum impact in fulfilling competent workforce market. Primary data were derived from observations, and conduct focus group interviews with workforces. Secondary data were obtained from websites, policy documents, curriculum and syllabus documents and teaching materials. This study focused on understanding of vocational curriculum, level of skill and qualification and apprenticeship outcomes.

3. Training Programs in Vocational Training Center

Public non-formal vocational training providers (known as BalaiLatihanKerja / BLK), that are under the responsibility of district governments or Ministry of Manpower and Transmigration, provide training programs for poor individuals who dropped out of primary or secondary school**[6]**.BLKs are also divided into 3 types:

1. Type A (largest training providers located in urban areas)
2. Type B (training providers located in smaller urban centers)
3. Type C (the smallest training providers located in rural areas

Larger centers provide industrial and service skills training, while smaller ones offer training in different technologies and skills for self-employment. There are 4 types of training offer by BLK:

1. Institutional training (job training programs which aim to increase the skills of job seekers)
2. Non-institutional training (training programs for people in remote areas organized through Mobile Training Units)
3. Apprenticeship programs
4. Demand-based trainings (trainings based on the demand of industries)

The success of vocational training can be measured from the absorption rate of graduates in the work market. If graduates have the capabilities as required work market, it can be said vocational institution learning process have direct and prepared learners for entrance work market. To achieve this, vocational training provider,

i.e. BLK, always improved the quality of learning through the curriculum in accordance with the demand of job markets**[7]**.

Four types of training that be held in BLKs will succeed attempts aiming at measuring training provided by the employers tend to focus on formal training only and to neglect therefore the informal learning processes we can approach informal training using information on whether young workers declared they learnt their job on their own, and not through the three other forms of training. The apprenticeship in a large firm is another form of formal training, with traditionalapprenticeship**[8]**. The categorization of vocational education and training was described in Figure 1.

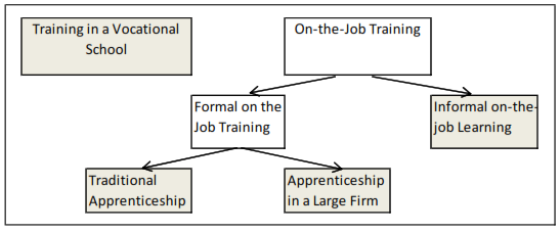

Figure 1. Categorization of vocational education and training

3.1 Vocational Training Curriculum

Vocational training curriculum must accommodate all of the needs of both the physical needs of learners, non-physical, and moral as well as their future to be able to live a safe, comfortable, good welfare, and harmony with nature and the surrounding communities. On the other hand based vocational training curriculum needs matching withjob markets(demand-driven by job markets). The emphasis was on the mastery of the competencies required by industry job markets **[9]**. The world of work requires seven basic skills as follows**[10]**:

1. Critical thinking and problem solving.
2. Collaboration across networks and leading by influence.
3. Agility and adaptability;
4. Initiative and entrepreneurship.
5. Oral and written communication effectively.
6. Accessing and analyzing information.
7. Curiosity and imagination.

Competentgraduates must have good fundamental skillsand generic work skills. General skills consist of basic skills, thinking skills, and personal qualities**[11]**. Basic skills include listening skills, reading, writing, speaking, and math. Thinking skills include how to learn, how to create and solve problems , and make decision. Personal qualitiesaffect in the form of responsibility, integrity, confidence, moral, character, and loyalty. Theoretically, the basic skills will support and become foundation of development individual career. Vocational training curriculum development, teaching and learning should provide a sufficient portion for the development of basic skills. Over fundamental skills were built genericworkskills,industry-specific skills and company/employer specific skills as shown in Figure 2.

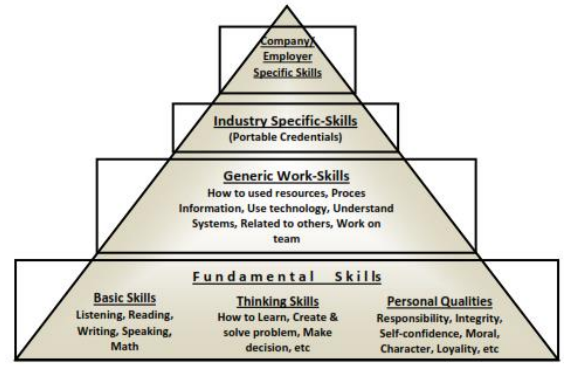

Figure 2. Structure development of vocational education and training skills

Competency-based curriculum can be developed with a “field research” or a “benchmark, adopt and adapt” as well as a combination both of them**[12]**. Field research done by conducting research in the job markets to collect primary data on the jobs that exist and then formulated into a draft of competency standards, validated, tested, reviewed, and establishment.Benchmark, adopt and adaptwas a way to study and compare the standards of competence which has existed in various developed countries or develop the required standards adopted and adapted to the needs. After passing the validation, testing and reviewing, these standards could be set as the first edition of the competency standard. This combination approach was to combine the two methods

above, to reduce weaknesses and improve the advantages of both methods.

President Decree No. 8, 2012 for Indonesian Qualification Framework has been a basic rule to develop competency based curriculum matching with job level in various industry. IQF consists of nine (9) qualification levels as shown in Table 1 below.

Table 1. IQF Level Description

Level	Para-meter	Description
1	Job Skills	Able to carry out simple tasks, limited, routine, with using of tools, rules, and established processes under guidance from his supervisors
	Knowledge	Having factual knowledge
	Managerial	Responsible only for own work
2	Job Skills	Able to carry out a specific task, using tools, information, and work procedures, and shows the performance with measurable quality, under direct supervision
	Knowledge	Having a basic operational knowledge and factual knowledge of specific areas of work
	Managerial	Responsible for own work and be responsible for guiding others
3	Job Skills	Capable to carry out a series of specific tasks, by translating the information and use of tools, based on working procedures, and able to demonstrate the quality and performance with measurable quantity
	Knowledge	Having a complete knowledge of the operational, principles and general concepts related to the fact
	Managerial	Able to collaborate and communicate within working scope
4	Job Skills	able to complete the task with specific case information is limited to analyzed and select appropriate standardized method
	Knowledge	Master some basic principles of specific areas of expertise and are able to align with the factual issues in the field of work
	Managerial	able to work together and communicate, prepare a written report within a limited scope, and has initiative
5	Job Skills	able to complete the work in extensive scope, select the appropriate method from various options
	Knowledge	Master in certain theoretical concepts in general, as well as to formulate procedural problem solving
	Managerial	Able to manage group work and prepare a comprehensive written report
6	Job Skills	Able to apply their specific expertise and utilize science, technology, and / or the arts on the field in problem solving and able to adapt to the situation at hand
	Knowledge	Master in the art of certain theoretical concepts in general and theoretical concepts in a special section of knowledge and be able to formulate procedural problem solving
	Managerial	Responsible for own work and may be held for the achievement of the organization's work
7	Job Skills	Able to plan and manage resources under its responsibility, and evaluate works comprehensively using science, technology, and / or art to produce measures of strategic

Level	Para-meter	Description
		development of the organization
	Knowledge	Able to solve problems of science, technology, and / or art in the scientific field through mono discipline approach
	Managerial	Able to do research and take strategic decisions with full accountability and responsibility for all aspects
8	Job Skills	Able to develop knowledge, technology, and / or art in the field of scientific or professional practice through research, to produce innovative work and tested
	Knowledge	Able to solve problems of science, technology, and / or art in the scientific field through inter or multidisciplinary approach
	Managerial	Able to manage research and development and receive national and international recognition
9	Job Skills	Able to develop knowledge, technology, and / or new art in the field of scientific or professional practice through research, to produce creative works, original, and tested
	Knowledge	Capable of solving problems of science, technology, and / or art in the scientific field through inter approach, multi, and trans disciplinary
	Managerial	Able to manage research and development and receive national and international recognition

IQF provide qualification level framework of competency which can be equivalent and integrate among education, vocational training and work experience in order to give work competency recognition in various sector. Stage of levelling up of IQF can be shown in Figure 3.

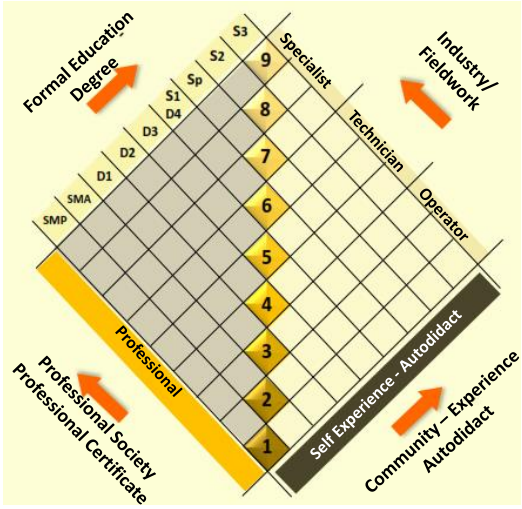

Figure 3. IQF Levelling up stage

Each BLK has develop its own programs base on levelling of IQF appropriate with its district characteristics. Now, some of BLKs type A (large training provide) try to standardize training program which be held in BLKs. Curriculums were be derived from these programs. The structure of each core training programs consists of eight parts: (1) training program tittle, (2) training program code, (3) training program level, (4) goals, (5) list of unit competence, (6) duration of training, (7) trainee pre requirement, (8) instructor requirement.

Over 80 training programs at BLK are now listed in the field of creative industry, business and management, automotive, electrical, construction, welding, information technology and manufacturing technology.Table 2 shows curriculum composition for some standardized training program in BLKs.

Table 2. Curriculum composition in BLKs

Field / Department	Position	Level	Qty of Unit Competency	Duration (Hours)	Trainee Requirement
Creative Industry	Sewing Operator	1	4	240	SMP
Creative Industry	Sewing Operator	2	5	160	SMP
Creative Industry	Sewing Operator	3	10	160	SMA
Creative Industry	Dress Maker	4	12	640	D3
Creative Industry	Craftsman	1	6	320	SD
Business and Management	Admin	1	6	150	SD/SMP
Business and Management	Admin	2	13	150	SMU/SMK
Business and Management	Admin	3	11	150	D1
Business and Management	Admin	4	10	150	D2
Business and Management	Admin	5	6	80	D2
Business and Management	Teknisi Akuntansi Junior	2	8	120	SMA
Business and Management	Teknisi Akuntansi Pratama	3	3	120	SMK Akuntansi/D1 Akuntansi
Business and Management	Teknisi Akuntansi Muda	4	2	80	SMK Akuntansi/D2 Akuntansi
Business and Management	Teknisi Akuntansi Madya	5	5	80	SMK Akuntansi/S1
Business and Management	Teknisi Akuntansi Ahli	6	8	80	S1 Akuntansi
Automotive	Operator	1	10	240	SMP
Automotive	Junior Mechanic	2	12	320	SMP
Automotive	Junior Mechanic	3	33	80	SMU
Automotive	Junior Technician	4	9	80	D1 Otomotif
Automotive	Senior Technician	5	25	640	D3 Teknik Mesin/Otomotif
Automotive	Master Technician	6	10	150	D3 Teknik Mesin/Otomotif
Electrician	Refrigeration Operator	1	6	240	SMP
Electrician	Refrigeration Operator	2	9	80	SMP
Electrician	Refrigeration Operator	3	7	80	SMP

Table 2. Curriculum composition in BLKs (continued)

Field / Department	Position	Level	Qty of Unit Competency	Duration (Hours)	Trainee Requirement
Construction	Drafter CAD	2	8	100	SMU
Construction	Measurument Operator	2	3	40	SMU
Construction	Measurument Operator	3	5	40	SMU
Construction	Measurument Operator	3	6	40	SMK
Construction	Foreman	3	21	160	SMK
Construction	Construction Technician	4	28	160	S1 Teknik Sipil/Arsitektur
Electric	Audio Video Operator	1	4	80	SD
Electric	Audio Video Operator	2	4	80	SMP
Electric	Audio Video Operator	3	5	80	SMU/SMK
Electric	Audio Video Technician	4	2	120	D1
Welding	Welder (GMAW/FCAW)	3	14	636	D3
Welding	Welder (SMAW/IMMAW/1	3	14	636	D3
Welding	Welder SMAW	1	12	160	SMP
Welding	Welder SMAW	2	10	160	SMU
Welding	Welder SMAW	3	9	160	SMU
Welding	Welder SMAW	3	23	320	D3/S1
Electric	Power Installer	1	8	240	SMA
Electric	Power Installer	2	10	240	SMA
Electric	Power Installer	3	11	240	SMA
Electric	Wiring Installer	1	6	40	SMP
Electric	Wiring Installer	2	9	40	SMP
Electric	Wiring Installer	3	11	40	SMP
Electric	Otomasi	1	8	240	SMK
Electric	Otomasi	2	10	240	SMK
Electric	Otomasi	3	13	240	SMK
Electric	Listrik	4	25	640	D3
Information Technology	Database	1	4	40	SMA
Information Technology	Database	2	6	40	D3
Information Technology	Database	3	4	40	S1
Information Technology	Graphic Designer	1	6	80	SMA
Information Technology	Graphic Designer	2	11	80	D3
Information Technology	Graphic Designer	3	10	80	S1
Information Technology	Digital Animator	2	18	80	D3
Information Technology	Digital Animator	3	6	80	S1
Information Technology	Network Administratot	1	8	40	SMA
Information Technology	Network Administratot	2	8	40	D3
Information Technology	Network Administratot	3	11	40	S1
Information Technology	System Administrator	1	8	40	SMA
Information Technology	System Administrator	2	11	40	S1
Information Technology	System Administrator	3	8	40	S1
Information Technology	Office Tool	1	4	40	SMA
Information Technology	Office Tool	2	4	40	D3
Information Technology	Office Tool	3	7	40	S1
Information Technology	Multimedia Programmer	2	4	80	S1
Information Technology	Multimedia Programmer	3	6	80	S1
Information Technology	Programmer	1	7	40	SMA
Information Technology	Programmer	2	8	40	D3
Information Technology	Programmer	3	6	40	S1
Information Technology	Web Programmer	1	8	80	SMA
Information Technology	Web Programmer	2	8	80	D3
Information Technology	Web Programmer	3	8	80	S1
Information Technology	Technical Support	1	10	100	SMA
Information Technology	Technical Support	2	16	100	D3
Information Technology	Technical Support	3	20	100	S1
Manufacturing Technology	Operator Bubut	3	11	100	SMA
Manufacturing Technology	Operator CNC Frais	4	20	100	SMA
Manufacturing Technology	Teknik Manufaktur	5	19	636	D3/S1

In general, vocation training programs in BLKs can provide competent workforce until level 5 which able to complete the work in extensive scope, select the appropriate method from various options. In managerial competency, able to manage group work and prepare a comprehensive written report. Training duration vary from 40 hours (equivalent with 1 weeks), 160 hours (equivalent with 1 month), until 640 hours (equivalent with 7 months). Trainee education requirement as a pre requisite vary from elementary school (SD), junior high school (SMP), senior high school (SMA/SMK), Diploma and Bachelor. It means, vocational training programs with Indonesian Quality Framework scheme were a flexible process in giving competency recognition.

3.2 Apprenticeship Based Training

Vocational training attempts to support both curriculum ideologies but through its alignment with industry is oriented more towards vocational educational outcomes than higher education**[13]**. Model of vocational training scheme needs to be reviewed and re-developed. At least there are four models of vocational training that can be applied in developing and developed countries**[12]**.

1. Vocational trainingwith school model was a model of vocational education in which education and training was fully implemented at the form of polytechnic. This model assumes everything that happens in the workplace can be educated at the polytechnic learning process. Thus, polytechnic must complete all types of equipment needed in large quantities. Polytechnic became very expensive because need to invest equipment in following state of the art, but actually changes in the world of business and industry more advanced and faster than what can polytechnic do.
2. Vocational training with dual system model, was a model to provide education and training that combines learning experiences in the polytechnic and valueof work experience in industry. This model was very good because it considers learning in polytechnics and work experience would be complementary, more meaningful, and real. Actually, work habits in the real world of work was difficult because the learning processes tend to form habits of study. Discipline on real workwas very different with discipline in learning and training. The weakness of the dual system was very susceptible to changes in social, economic, and political.
3. Vocational training with a model of apprenticeship.This model was fully devolved to industry training and community without the support of the training provider. Training provider only held normative subjects, adaptive, and fundamental skills. This model only suitable for developed countries that already have strong system of vocation training and good industrial relation between industry and training provider.
4. Vocational training with a model of school-based enterprise. This model develop training provider as business and production base.This model will raise income and fully provide work experience value to training participants.

From explanation above, dual system vocational training programs with apprenticeship give many advantages in ensuring training participant competence. Moreover training provider can be positioned as business and production base. As an example, the crucial importance of dual training in Germany, the various training programs are brought together to give an overall picture showing the training status ultimately achieved by one cohort**[5]**. Figure 3 describe in 2004, approximately 53 % of the young people in one cohort completed a course of vocational training in the dual system.

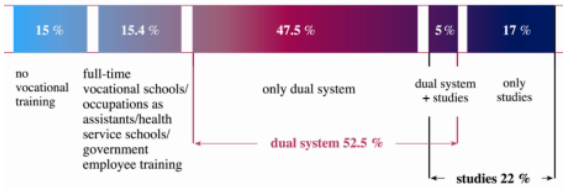

Figure 4. Cohort structure by type of qualification in Germany

BLKs have many dual system vocational training programs in collaboration with industry with apprenticeship scheme. Famous program was competency based training with 1 month on the job training or off the job training. For example in Surakarta Vocational Training Center has trained 2531 trainees (165 packages) at 2013**[14]**. Most of trainees did off the job training during following training programs in BLKs, others follow on the job training in industry.

3.3 Curriculum Integration for CBT programs

In the collaboration between training provider and industry, all programs must be formulated with the same cooperation between industry and the training provider. Programs consist of curriculum, teaching materials, evaluation, recruitment of participants, instructors, funding, and execution time. Vocational education will be efficient and effective if**[15]**:

1. environment where trainee trained was a replica environment in which trainee will work.
2. tasks given to the students were done in same way, tools and machines which appropriate with workplace.
3. conduct by instructors who have experience and success in applying the skills and knowledge of the work operations and processes.
4. could foster effective work habits to students. This only happen if the training was given in the form of a real job.
5. trainings given only to someone who needs it, who wants it and who can get benefit from it.

During 2013 Surakarta Vocational Training Centre did 4 packages (64 trainees) competency-based training programs (CBT) integrated with industry curriculum in field of Welding and Automotive. Programs held on 3 months training in BLK and 3 months in industry apprenticeship. This scheme give excellent result in outcomes workforce absorption and assure trainees competency.

Observation and focus group conduct to confirm curriculum appropriateness with questionnaire. Six questions were asked to trainees after they completing training and apprenticeship programs. Questionnaire questions as below.

1. Training contents have matched with training program goals.
2. Quality of training contents increase your skill and knowledge.
3. Training contents schemes have been arranged from basic until advanced.
4. Training contents were easy to be learnt and understood.
5. Training contents have fulfill your expectation.
6. Appearance, and training content format.

Measurement of curriculum acceptance from trainees side use 4 scales, that were 4 (very good), 3 (good), 2 (enough) and 1 (poor). Thus, expectationwas 4 (very good). After calculated the results of questions 1-6 were good and very good. It means improvement with curriculum collaboration competency-based training and apprenticeship give good impact for trainees.

4. Workforce Market Needs

Efforts have been made to improve the relevance and absorption of graduates by building cooperation between the business / industry and training provider, especially

with BLKs. The cooperation contains curriculum improvement, implementation of apprenticeship, training together and so on.Moreover, training activities can only be expected from companies in a good or at leastsufficient profit situation. On the one hand this reveals the risk that changes in profits are an important cyclical driver of apprenticeship supply. On the other, it points to the strong impact of cost considerations. This is not because the net costs of apprenticeship training (training costs minus the value of productive contributions by apprentices) are significantly high. It relates much more to the easier and cheaper alternative, which allows covering skills needs by the recruitment of vocational school graduate. From an employer cost perspective, apprenticeship training is cheap, as the apprenticesmainly take the burden of costs. Employers particularly benefit when the apprentice is retained in the company after training, as a recruitment decision is already made during training. This helps to meet future skills needs more precisely and avoid skills shortages. Taking on an apprentice after training avoids the costs of on-the-job training for the would-be externally recruited employees and is often the cheaper solution. In order to retain apprentices and thus extend the pay-off period of training investments it is crucial to provide career opportunities in the company**[16]**.

From Table 3 can be described composition by workforces in 2013. Agriculture, forestry and plantation place first grade nationally to the number of 34.4%. Then following by trading and retail (24.4%), service (16.4) and manufacture industry (13.4).

A great quantities in workforce open opportunity in fulfilling competent labor market demand. With prediction of economic growth around 6 %, will create many hundred thousands of job opportunity. BLKs vocational training programs must meet with prospective sector which can offer job opportunity. Around 80 training program which have been mentioned at previous section already prepared against this opportunity. In 2013, for example at Surakarta Vocational Training Center, there are 125 companies send job opportunity from operator, technician until supervisor level.

Table 3. Field work composition by workforce in 2013

No.	Lapangan Pekerjaan Utama	2013		
		Februari	Agustus	%
1	Pertanian, Perkebunan, Kehutanan, Perburuan dan Perikanan	39,959,073	38,068,254	34.4
2	Pertambangan dan Penggalian	1,555,564	1,420,767	1.3
3	Industri	14,784,843	14,883,817	13.4
4	Listrik, Gas dan Air	254,528	250,945	0.2
5	Konstruksi	6,885,341	6,276,723	5.7
6	Perdagangan, Rumah Makan dan Jasa Akomodasi	24,804,705	23,737,236	21.4
7	Transportasi, Pergudangan dan Komunikasi	5,231,775	5,040,849	4.5
8	Lembaga Keuangan, Real Estate, Usaha Persewaan dan Jasa Perusahaan	3,012,770	2,912,418	2.6
9	Jasa Kemasyarakatan, Sosial dan Perorangan	17,532,590	18,213,032	16.4
10	Lainnya	-	-	-
	Total	**114,021,189**	**110,804,041**	**100.0**

Source : SAKERNAS BPS 2013

5. Conclusion and Future Works

Vocational trainingwas the trainingfor workforce to provide skilled workers / professionals who have a key role in industry. Partnership between vocational training institutions and industry was a necessity. Vocational training institutions can not only organize the learning with school-based learning, but also have to work-based learning scheme to prepare competent graduates for fulfilling job market demand.For further research it is recommended to make curriculumcomparison and curriculum of apprenticeship based training implementation evaluation to all vocational training under ministry of manpower and transmigration and vocational training under district governments.

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